

Clever Clickers: Using Audience Response Systems in the Classroom

By Heidi Adams and Laura Howard

INTRODUCTION

Audience Response Systems, commonly known as clickers, are gaining recognition as a useful classroom tool. Utilized in college lecture halls for approximately 10 years, they have become more affordable and are now moving into elementary and secondary classrooms. An Audience Response System (ARS) is computer hardware and software designed to administer questions and polls to students and immediately display their feedback. While operating an ARS, the teacher presents information which can be formatted using PowerPoint, Word, or other formats. This multimedia information can include, but is not limited to, lecture information, multiple choice questions, true/false questions, and survey questions. On the other side of the operation, students are given handsets to respond to the questions posed. Answers are transmitted through their handsets to the ARS receiver where they are collected and analyzed by the computer software. Responses can be immediately displayed in various forms, and the data is also stored for educators to use later in different forms such as graphs or grading programs. "These systems can not only provide valuable feedback to both instructor and students during a class, but can also facilitate changes in both student and instructor behavior that enhance teaching and learning" (Wood, 2004). Audience Response Systems are an impressive device available to educators for increased student achievement.

Audience Response Systems are available in two formats: infrared (IF) and radio frequency (RF). Both use the same basic components of a receiver and handsets which are used in conjunction with a computer and a projector. Infrared systems use infrared technology in the same way as television remote controls. The handset must be aimed toward the receiver, and a direct line of sight to the receiver is required. Radio frequency does not require direct line of sight or direct aim. Each has advantages and disadvantages. The IF system is more affordable, but is more limited in the types of answers (true/false, yes/no, and multiple choice with up to eight answer choices on the Classroom Performance System (CPS) model). The RF system is more expensive, but in addition to the

above types of answers, numeric answers are also an option. With both IF and RF, graphics can be included in the question and/or answer. The chalkboard option available with some models allows for further explanation of answers. The assessment options are the same for both systems.

Figure 1 is an example of an infrared handset. It is more streamlined and simpler to use with fewer options than the RF handset.

Figure 2 is an example of a radio frequency handset. It offers more options for answers and is a little more complicated, but certainly understandable for upper elementary school, middle school, and high school students.

UTILIZING ARS

Educators have many choices when it comes to how they will use an ARS with their students and what they will do with the data collected. The flexibility of an ARS makes it possible for each educator to customize them for their classroom needs. Uses of ARS include checking for understanding, assessing, and gaining student feedback.

CHECKING FOR UNDERSTANDING

ARS has brought about a quick and efficient way for teachers to check for understanding in their classroom. With ARS, educators can interject different types of review or practice questions in their multimedia presentations. The questions can include multiple choice and true/false. Whenever a question is posed during the presentation, students use their handsets to give their answers and the results are displayed immediately. Since the educators are able to see the results instantly, it permits them to evaluate student understanding at that very moment and provides an opportunity to adjust the lesson accordingly to improve student comprehension.

ASSESSMENT

Audience Response Systems make assessment easier and faster. Educators have the option to create tests and quizzes with ARS programs. Educators can assess what students already know by creating pretests to identify what instruction is

FIGURE 1



FIGURE 2



needed to meet the objectives. Students can use their handsets to answer test and quiz questions and an ARS produces the results automatically. Not only does this make grading easier, but it allows students to receive instant feedback.

STUDENT FEEDBACK

More innovative uses for clickers include polling and voting to gain student feedback. Students enjoy having a voice in the classroom and an ARS is an effective way to receive student input. Educators are able to create polling questions to investigate what students think and what they like and dislike. For example, an educator might ask students, "I enjoyed participating in the community activity," and have multiple choice answers such as a) strongly agree, b) agree, c) neutral, d) disagree, and e) strongly disagree. Educators can use the information to the students' educational advantage. An ARS also allows students to vote on different aspects of the class. It takes the counting out of voting for educators and allows students to vote anonymously.

SPECIFIC IDEAS FOR USING ARS

Many schools are teaching students the 21st century skills they need to live in this fast-paced, quickly changing world (<http://ala.org/ala/mgrps/divs/aasl/aaslpfotools/learningstandards/standards>).

cfm). The specific ideas listed below can be used to promote those skills.

1 Comprehension Testing

Many schools have extracurricular book clubs. Use the clickers to ask comprehension questions.

2 Drill and Practice

Use clickers for drill and practice exercises in math and spelling or create a competition for the most correct or quickest correct answer.

3 Accountability

After assigning pages or chapters to read, use clickers to ask basic questions to verify that students completed the assignment.

4 Review Games

Design a game similar to *Jeopardy* to help students prepare for upcoming exams.

5 Customized Study Guides

Since each student's response is recorded and the questions are already saved in the computer, all that is necessary is to print a set of questions with the student's responses so they can study the areas for which they chose the wrong answer.

6 Unit Testing, Midterms, and Final Exams

Rather than using paper copies for testing, use clickers for multiple choice and true/false questions. Student responses are recorded and automatically scored. Tests could then be printed for class discussion.

7 Questionnaires/Surveys

Clickers are a great way to obtain student input. Design a survey for students on what topics they are most interested in and from there you can teach them what they would like to learn.

8 Voting

Instead of paper ballots, use clickers for voting. For example, for student council elections, clickers could be set up in a designated area and students could vote one class at a time and totals would be automatically recorded.

9 Peer-Teaching Exercises

After teaching a concept, use clickers to help students discuss and teach each other. For example, use PowerPoint to teach a lesson about researching. Incorporate the ARS system into your PowerPoint and periodically ask a question about the steps. Have students discuss the question before answering.

10 Checking for understanding during a lecture

During lectures, it always seems to be the same few students who answer the questions asked to check for student understanding. By periodically asking questions during a lecture using clickers, all students are expected to respond so the instructor has a more accurate understanding of student comprehension.

11 Checking for student engagement

Again, those same few students are the students who are more actively involved. By using clickers, all students are expected to respond. When all students are aware that they will be expected to answer questions during the lecture, they will listen more actively.

12 Parent Input

During curriculum night clickers can be used to see what the parents would like done in the classroom or how they feel about their child's learning.

13 Games

During school Reading or Math nights, a classroom could be equipped with clickers for a game creating a competition with students against adults. Are you really smarter than a fifth grader?

14 Teacher Input

Use clickers for teacher interaction and polling during in-service and staff meetings.

15 Math Instruction

The chalkboard feature offered with some models allows students to show how they solved a problem. For example, ask an algebraic question and all students answer it. The instructor can randomly select a student who answered correctly to explain the process to the class using the chalkboard feature.

16 Art Classes

Test student knowledge of art appreciation by using graphic representations of paintings or sculptures.

17 Language

Younger students can use clickers to work on phonemic awareness. For example, a question could be posted asking which picture starts with an S along with four picture choices. This is similar to worksheets teachers are very familiar with, but with instant feedback and fewer papers to correct.

18 Fact Finding

One of the 21st century skills is properly identifying the appropriate source for certain information. Use a pre-test to determine students' level of understanding then conduct a post-test after teaching the unit to make sure that they understand the correct source of facts.

19 Aptitude Test

Many schools offer aptitude tests to identify student interests. This testing could be done using clickers and results are ready immediately.

20 Teacher In-Service

Copyright issues are difficult to understand and always changing. Many instructors are unknowingly violating copyright laws. A teacher in-service about copyright could be conducted with fact/fiction questions.

ADVANTAGES

The benefits of using Audience Response Systems are numerous. The various question formats make it possible to use it in several ways including both individual and group work. Students become more actively engaged in the classroom and receive immediate feedback. In addition, efficient assessment is helpful for educators and beneficial to students.

ENGAGEMENT

We all have known the shy or unsure student who never raises his or her hand. With an ARS, students become more engaged. "Most research on the benefits of using clickers in the classroom has shown that students become engaged and enjoy using them" (Martyn, 2007). Not only do most students enjoy using this system simply because it is fun, but anonymity draws in those students who are afraid to contribute. Student responses are recorded by number so students are free to respond without the fear of being criticized for incorrect answers or unpopular opinions. While the identity of the student using a particular clicker is unknown to the general class, the educator may manage the clicker in such a way that they know the identity of each number. In a class discussion, it would be very time consuming for every student to answer every question. With clickers, every student answers every question. Additionally, the questions will spark more questions from students that will lead to further discussion and understanding regarding the material.

INSTANT FEEDBACK

The instant feedback of Audience Response Systems is advantageous to both students and educators. Students can know immediately if they have the correct or incorrect answer. They have the opportunity to gauge their own understanding and ask questions if necessary. Educators can assess student comprehension before it is time for the test, even within a lesson, and adjust their lesson accordingly. Some students often feel that they are the only ones who answer incorrectly or do not understand a concept. With ARS, the instantaneous graphs showing the results can be shared with the class to provide an accurate measure of understanding. Study guides can be created using the software and the questions that educators have already input so students can be provided with customized study guides that include their own particular area of need for study.

ASSESSMENT

What teacher does not long for a quick grading system as opposed to taking papers home and correcting them after supper? With an ARS, grading is completed immediately and automatically. The software can often be linked with grading programs. Completed tests and quizzes can be printed and handed out to students. Assessment becomes a more efficient and beneficial process with an ARS.

DISADVANTAGES

Disadvantages are few, but worth considering. Even though most students enjoy using clickers, part of the appeal is their novelty. As with any other type of learning, if ARS is used too often, students tire of it. Part of the student population may not enjoy using them or may use them in a negative manner. ARS is merely a tool, effective only if used properly.

Educators might be hesitant to use ARS because of the time investment needed to learn how to use ARS and to input questions into the system for initial use, but they must keep in mind that the questions can be saved and remain available for use with multiple and future classes. A school's or teacher's decision not to use ARS might be greatly affected by the expense of the system; however, benefits of ARS will quickly become more valuable than the money used to purchase it. In addition, most models do not allow for open-ended questions or essay-type answers.

TYPES OF RF ARS

Classroom Performance System

www.einstruction.com

- Handset offers 3-line LCD screen
- Multiple Choice with up to eight possible answers
- 13-character numerical including decimal and negative numbers
- No text

Qwizdom

www.qwizdom.com

- Handset offers 3-line LCD screen
- Multiple Choice with up to 7 possible answers
- 12-character numerical including decimal, negative, and fractional numbers
- Text

TurningPoint

www.turningtechnologies.com

- No LCD screen on handset
- Multiple Choice with up to 10 possible answers
- No numerical capabilities
- No text

(From "Clicker Evolution: Seeking Intelligent Design" by M. Barber & D. Njus, published in *Life Sciences Education Spring 2007, Vol. 6*)

Interwrite PRS

www.gtco.com

- Handset offers 2-line LCD screen
- Multiple Choice with up to 5 possible answers
- Numerical including decimal and negative numbers
- No text

iClicker

www.iclicker.com

- No LCD screen on handset
- Multiple Choice with up to 5 possible answers
- No numerical capabilities
- No text

H-ITT (Hyper-Interactive Teaching Technology)

www.h-itt.com

- No LCD screen on handset
- Multiple Choice with up to 10 possible answers
- Numerical capabilities with whole numbers
- No text

CONCLUSION

Over the years many technological tools have been developed to use in the classroom. The Audience Response System is one of the latest inventions making its way into schools. Audience Response Systems are a combination of media software, such as PowerPoint, and hardware consisting of a receiver and handsets. Educators can use ARS in many different ways, such as asking students review questions or testing. Using an ARS has its disadvantages, but it is obvious that the advantages such as instant feedback and increased student engagement far outweigh the downsides. An ARS is a versatile tool that educators could use in their classrooms to benefit not only their students, but themselves as well. 🌈

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